

What is claimed is:

1           1.       A quality of service (QoS) station containing a point coordinator (PC) for a  
2       basic service set (BSS) in a wireless network, the PC comprising:  
3               a QoS management entity (QME) receiving at least one end-to-end QoS  
4       message characterizing a user application, the at least one end-to-end QoS message including  
5       at least one QoS parameter set that is expressed at layer 3 and higher of an ISO/IEC basic  
6       reference model of Open Systems Interconnection (OSI) (ISO/IEC 7498-1) and is to be  
7       passed down to layer 2 of the PC-station for enabling QoS traffic transport of the application;  
8       and  
9               an admission control entity (ACE) performing an admission control decision  
10       relating to the application based on the at least one end-to-end QoS message characterizing  
11       the  
12       application.

1           2.       The QoS PC station according to claim 1, wherein the wireless network is a  
2       wireless local area network (WLAN).

1           3.       The QoS PC station according to claim 1, wherein the user application is one  
2       of a voice call, a video call, a data call and a multimedia call.

1           4.       The QoS PC station according to claim 3, wherein the user application joins at

2 least one other existing user application.

1 5. The QoS PC station according to claim 1, wherein the ACE includes at least  
2 one of a resource control module and a policy control module, the resource control module  
3 performing at least one admission control decision based on resource permission and the  
4 policy control module performing at least one admission control decision based on policy  
5 permission.

1 6. The QoS PC station according to claim 1, wherein the ACE is part of the  
2 QME.

1 7. The QoS PC station according to claim 1, wherein the at least one end-to-end  
2 QoS message characterizing the application is a request for admitting the application to the  
3 wireless network,

4 wherein the ACE, responsive to the at least one end-to-end QoS message,  
5 rejects or admits the requesting application to the wireless network based on an outcome of  
6 the admission control decision, and

7 wherein the QME, responsive to an admitted application, establishes at least  
8 one virtual stream (VS) in layer 2 of the BSS for transporting the traffic of the application  
9 between logical link control (LLC) sublayer entities within the BSS.

1           8.     The QoS PC station according to claim 7, wherein the QME assigns a VS  
2     identifier (VSID) to each VS established for the admitted application.

1           9.     The QoS PC station according to claim 7, further comprising:  
2                 a frame classification entity (FCE) having a classification table associating  
3     one of the VSID established for the application with a frame classifier, the FCE being  
4     logically located in a LLC sublayer of layer 2 in the QoS PC station; and

5                 a frame scheduling entity (FSE) having a scheduling table associating the at  
6     least one of the VSID established for the application with at least one QoS parameter set  
7     characterizing the application on a one-to-one basis, the FSE being logically located a  
8     medium access control (MAC) sublayer of layer 2 in the QoS PC station;

9                 wherein the QME of the PC station extracts at least one frame classifier from  
10    the at least one end-to-end QoS message characterizing the application, and passes at least  
11    one extracted frame classifier together with one of the at least one VSID established for the  
12    application to the FCE, each extracted frame classifier containing at least one classification  
13    parameter identifying frames of the application with one of the at least one VSID established  
14    for the application, the FCE, responsive to the passed VSID and frame classifier for the  
15    application, adding the passed VSID and frame classifier to the classification table, and

16                 wherein the QME passes the at least one VSID established for the application  
17    and the at least one QoS parameter set characterizing the application to the FSE, the FSE,  
18    responsive to the at least one VSID and the at least one QoS parameter set passed for the

19 application, adding the at least one VSID and the at least one QoS parameter set passed to  
20 the scheduling table.

1 10. The QoS PC station according to claim 9, wherein the QME is further  
2 responsive to the admitted application by causing the PC station to send a management frame  
3 to each non-PC station participating in the admitted application in the BSS, the management  
4 frame containing information defining one of the at least one VSID established for the  
5 application, one of the at least one classifier extracted for the application, and one of the at  
6 least one QoS parameter set characterizing the application, the information in the  
7 management frame being for a new admitted application.

1 11. The QoS PC station according to claim 10, wherein a non-PC station  
2 participating in the application includes a QME and an FCE, the participating non-PC station  
3 receiving the management frame and passing the information contained in the management  
4 frame to the QME of the non-PC station, and the QME of the non-PC station passing the  
5 frame classifier and the VSID contained in the management frame to the FCE of the non-PC  
6 station.

1 12. The QoS PC station according to claim 11, wherein the non-PC station  
2 participating in the application further includes an FSE, the QME of the non-PC station  
3 passing the VSID and the QoS parameter set contained in the management frame to the FSE.

1           13.     The QoS PC station according to claim 9, wherein the FCE of the PC station  
2     receives a frame at the LLC sublayer and classifies the frame to be associated with a VSID  
3     established for an application; and  
4                 wherein the FSE schedules transmission of the classified frame based on the  
5     QoS parameter set associated with the VSID.

1           14.     The QoS PC station according to claim 9, wherein the FCE of the non-PC  
2     station receives a frame at the LLC sublayer and classifies the frame to be associated with a  
3     VSID established for an application,  
4                 wherein the FSE of the PC station schedules a transmission opportunity (TO)  
5     for the classified frame based on the QoS parameter set associated with the VSID, and  
6                 wherein the FSE of the non-PC station schedules transmission of the  
7     classified frame based on the TO and the QoS parameter set associated with the VSID for the  
8     classified frame.

1           15.     The QoS PC station according to claim 1, wherein the ACE reserves a  
2     resource based on a QoS parameter set contained in the end-to-end QoS message.

1           16.     The QoS PC station according to claim 1, wherein the at least one QoS  
2     parameter set contained in the at least one end-to-end QoS message is a request for

3 modifying at least one QoS parameter set associated with an existing application,  
4 wherein the ACE, responsive to the at least one end-to-end QoS message,  
5 modifies the application based on a modification of the at least one QoS parameter  
6 associated with the application, and  
7 wherein the QME, responsive to the modified application, sends a  
8 management frame to each non-PC station participating in the application, the management  
9 frame containing information relating to the modification of the QoS parameter set for the  
10 application.

1 17. The QoS PC station according to claim 16, wherein a non-PC station  
2 participating in the application includes a QME, the participating non-PC station receiving  
3 the management frame and passing the information relating to the modification of the QoS  
4 parameter set to the QME of the non-PC station.

1 18. The QoS PC station according to claim 17, wherein the non-PC station  
2 participating in the application further includes an FSE, the QME of the non-PC station  
3 passing the modified QoS parameter set to the FSE of the non-PC station, the FSE of the  
4 non-PC station scheduling VS transmission based on the modified QoS parameter set.

1 19. The QoS PC station according to claim 1, further comprising:  
2 a frame classification entity (FCE) having a classification table associating a

3 frame classifier with a corresponding virtual stream identifier (VSID), and  
4 a frame scheduling entity (FSE) having a scheduling table associating a VSID  
5 with a corresponding QoS parameter set;  
6 wherein an existing application has at least one associated virtual stream  
7 (VS),  
8 wherein each VS has an associated VSID,  
9 wherein the at least one QoS parameter set contained in the at least one end-  
10 to-end QoS message is a request for terminating an existing application,  
11 wherein the ACE, responsive to the at least one end-to-end QoS message,  
12 releases a resource allocated to the existing application, and  
13 wherein the QME, responsive to the at least one end-to-end QoS message,  
14 instructs the FCE to remove the VSID and frame classifier associated with the existing  
15 application from the classification table, and further instructs the FSE to remove the VSID  
16 associated with the existing application from the scheduling table.

1 20. The QoS PC station according to claim 19, wherein the QME causes the PC  
2 station to send a management frame to each non-PC station participating in the application,  
3 the management frame containing information relating to a termination of the existing  
4 application.

1           21.    The QoS PC station according to claim 20, wherein a non-PC station  
2   participating in the application includes a QME and an FCE, the participating non-PC station  
3   receiving the management frame and passing the information contained in the management  
4   frame to the QME of the non-PC station, and the QME of the non-PC station passing the  
5   information relating to the termination of the existing application to the FCE of the non-PC  
6   station.

1           22.    The QoS PC station according to claim 21, wherein the non-PC station  
2   participating in the application further includes an FSE, the QME of the non-PC station  
3   passing the information relating to the termination of the existing application to the FSE of  
4   the non-PC station.

1           23.    A method for setting up a user application in a wireless network, the  
2   communication session having a defined quality of service (QoS), the method comprising  
3   steps of:

4                   receiving at a QoS management entity (QME) of a point coordinator (PC)  
5   station at least one end-to-end QoS message characterizing the user application, the at least  
6   one end-to-end QoS message including at least one QoS parameter set that is expressed at  
7   layer 3 and higher of an ISO/IEC basic reference model of Open Systems Interconnection  
8   (OSI) (ISO/IEC 7498-1) and is to be passed down to layer 2 of the PC-station for enabling  
9   QoS traffic transport of the application; and



10 performing at an admission control entity (ACE) of the PC station an  
11 admission control decision relating to the application based on the at least one end-to-end  
12 QoS message characterizing the application, the ACE being part of the QME of the PC  
13 station.

1 24. The method according to claim 23, wherein the wireless network is a wireless  
2 local area network (WLAN).

1 25. The method according to claim 23, wherein the user application is one of a  
2 voice call, a video call, a data call and a multimedia call.

1 26. The method according to claim 25, wherein the user application joins at least  
2 one other existing user application.

1 27. The method according to claim 23, further comprising steps of  
2 performing by a resource control module of the ACE at least one admission control decision  
3 based on resource permission; and  
4 performing by a policy control module of the ACE at least one admission  
5 control decision based on policy permission.

1 28. The method according to claim 23, wherein the at least one end-to-end QoS

2 message characterizing the application is a request for admitting the application to the  
3 wireless network,

4 the method further comprising steps of:

5 rejecting or admitting by the ACE the requesting application to the wireless  
6 network based on an outcome of the admission control decision, and

7 establishing by the QME at least one virtual stream (VS) in layer 2 of the BSS  
8 for transporting the traffic of the application between logical link control (LLC) sublayer  
9 entities within the BSS.

1 29. The method according to claim 28, further comprising a step of assigning a  
2 VS identifier (VSID) by the QME to each VS established for the admitted application.

1 30. The method according to claim 28, further comprising steps of:

2 forming at a frame classification entity (FCE) of the PC station a  
3 classification table associating one of the VSID established for the application with a frame  
4 classifier, the FCE being logically located in a LLC sublayer of layer 2 in the QoS PC  
5 station; and

6 forming at a frame scheduling entity (FSE) of the PC station a scheduling  
7 table associating the at least one of the VSID established for the application with at least one  
8 QoS parameter set characterizing the application on a one-to-one basis, the FSE being  
9 logically located a medium access control (MAC) sublayer of layer 2 in the QoS PC station;

10 extracting at the QME of the PC station at least one frame classifier from the  
11 at least one end-to-end QoS message characterizing the application; each extracted frame  
12 classifier containing at least one classification parameter identifying frames of the  
13 application with one of the at least one VSID established for the application;  
14 passing by the QME of the PC station the VSID assigned to one of the at least  
15 one VS established for the application and one of the at least one frame classifier to the FCE  
16 of the PC station;  
17 passing by the QME of the PC station the VSID assigned to one of the at least  
18 one VS established for the application and one of the at least one QoS parameter set  
19 characterizing the application to the FSE of the PC station;  
20 adding by the FCE of the PC station the passed VSID and frame classifier to  
21 the classification table; and  
22 adding by the FCE of the PC station the passed VSID and QoS parameter set  
23 to the scheduling table.

1 31. The method according to claim 30, further comprising a step of sending a  
2 management frame to each non-PC station participating in the admitted application in the  
3 BSS, the management frame containing information defining one of the at least one VSID  
4 established for the application, one of the at least one frame classifier extracted for the  
5 application, and one of the at least one QoS parameter set characterizing the application, and  
6 the information in the management frame being for a new admitted application.

1           32.    The method according to claim 31, wherein a non-PC station participating in  
2   the application includes a QME and an FCE,  
3                   the method further comprising steps of:  
4                   receiving the management frame message at the non-PC station;  
5                   passing to the QME of the non-PC station the information contained in the  
6   management frame, and  
7                   passing the frame classifier and the VSID contained in the management frame  
8   to the FCE of the non-PC station.

1           33.    The method according to claim 32, wherein the non-PC station participating  
2   in the application further includes an FSE,  
3                   the method further comprising a step of passing the VSID and the QoS  
4   parameter set contained in the management frame to the FSE.

1           34.    The method according to claim 33, further comprising steps of:  
2                   receiving a frame by the FCE of the PC station at the LLC sublayer and  
3   classifying the frame to be associated with a VSID established for an application; and  
4                   scheduling by the FSE of the PC station transmission of the classified frame  
5   based on the QoS parameter set associated with the VSID.

1           35.    The method according to claim 33, further comprising steps of:  
2                    receiving a frame by the FCE of the non-PC station at the LLC sublayer and  
3    classifying the frame to be associated with a VSID established for an application; and  
4                    scheduling by the FSE of the PC station a transmission opportunity (TO) of  
5    the classified frame based on the QoS parameter set associated with the VSID, and  
6    scheduling by the FSE of the non-PC station transmission of the classified frame based on  
7    the TO and the QoS parameter set associated with the VSID for the classified frame.

1           36.    The method according to claim 23, further comprising a step of reserving a  
2    resource based on the at least one QoS parameter set contained in the at least one end-to-end  
3    QoS message characterizing a user application.

1           37.    The method according to claim 23, wherein the at least one QoS parameter set  
2    contained in the at least one end-to-end QoS message is a request for modifying at least one  
3    QoS parameter set associated with an existing application,  
4                    the method further comprising steps of:  
5                    modifying by the ACE the application based on a modification of the at least  
6    one QoS parameter associated with the application; and  
7                    sending by the QME a management frame to each non-PC station  
8    participating in the application, the management frame containing information relating to the  
9    modification of the QoS parameter set for the application.

1           38.     The method according to claim 37, wherein a non-PC station participating in  
2     the application includes a QME,  
3                 the method further comprising steps of:  
4                 receiving the management frame by the participating non-PC station; and  
5                 passing the information relating to the modification of the QoS parameter set  
6     to the QME of the non-PC station.

1           39.     The method according to claim 38, wherein the non-PC station participating  
2     in the application further includes an FSE,  
3                 the method further comprising a step of passing by the QME of the non-PC  
4     station the modified QoS parameter set to the FSE of the non-PC station.

1           40.     The method according to claim 23, wherein the at least one QoS parameter set  
2     contained in the at least end-to-end QoS message is a request for terminating an existing  
3     application,  
4                 the method further comprising steps of:  
5                 releasing by the ACE, in response to the at least one-to-one QoS message, a  
6     resource allocated to the existing application, and removing by the FCE, in response to an  
7     instruction from the QME, the VSID and frame classifier associated with the existing  
8     application from the classification table; and

9 removing by the FSE, in response to an instruction from the QME, the VSID  
10 associated with the existing application from the scheduling table.

1 41. The method according to claim 40, further comprising a step of sending a  
2 management frame from the PC station to each non-PC station participating in the  
3 application, the management frame containing information relating to a termination of the  
4 existing application.

1 42. The method according to claim 41, wherein a non-PC station participating in  
2 the application includes a QME and an FCE,  
3 the method further comprising steps of:  
4 receiving the management frame at the participating non-PC station; and  
5 passing the information contained in the management frame to the QME of  
6 the non-PC station.

1 43. The method according to claim 42, wherein the non-PC station participating  
2 in the application further includes an FSE,  
3 the method further comprising a step of passing by the QME of the non-PC  
4 station the information relating to the termination of the existing application to the FSE of  
5 the non-PC station.